Desalination and Water Treatment
www.deswater.com

doi:10.5004/dwt.2018.22263

115 (2018) 82–87
May

Performance evaluation of a biological landfill leachate treatment plant and effluent treatment by electrocoagulation

Mahdi Sadeghi[a], Abdolmajid Fadaei[b,*], Mahem Tadrisi[c], Abotaleb Bay[d], Ali Naghizadeh[e]

[a]*Environmental Health Research Center, School of Health, Golestan University of Medical Sciences, Gorgan, Iran, email: mahdikargar1@gmail.com (M. Sadeghi)*
[b]*Department of Environmental Health Engineering, School of Health, Shahrekord University of Medical Sciences, Shahrekord, Iran, Tel. +983833365653, Fax +9833334678, email: amirfadae@gmail.com (A. Fadaei)*
[c]*Environmental Engineering, Islamic Azad University, Tehran, Iran, email: mtadrisi65@gmail.com (M. Tadrisi)*
[d]*Environmental Health Engineering, School of Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran, email: abotaleb_bay@yahoo.com (A. Bay)*
[e]*Medical Toxicology and Drug abuse Research Center (MTDRC), Birjand University of Medical Sciences (BUMS), Birjand, Iran, email: al.naghizadeh@yahoo.com (A. Naghizadeh)*

Received 11 September 2017; Accepted 25 March 2018

ABSTRACT

A major problem in municipal waste landfills is generation of leachate, a dark black colored liquid with high concentrations of pollutants. The objectives of this study were to evaluate the efficiency of available leachate treatment methods at a biological treatment plant and the electrocoagulation (EC) process using aluminum and iron electrodes for treatment of effluent from the biological treatment plant. In this experimental study, leachate from the AqQala landfill in Gorgan was examined. Equipment for electrochemical unit included a power supply as well as iron and aluminum electrodes. The EC process was operated under different reaction times (20, 40, 60 min), pH values (3, 7, 9) and current densities (1.66, 3.33, 5A/m^2). The results showed that the effluent from the biological treatment plant has high concentrations of organic matter similar to wastewater, and should therefore be treated before discharge to the environment. According to the results, increasing the reaction time or the current density in the EC process increases the removal efficiency. The EC process is suggested as an alternative treatment process with high efficiency for the removal of organic matter, nitrate, phosphorous and turbidity in sewage treatment, which could prevent water and soil pollution.

Keywords: Leachate; Organic matter; Electrocoagulation; Nitrate; Phosphorous

*Corresponding author.